



## DYNAMIC FEATURE EXTRACTION: AN APPLICATION TO VOICE PATHOLOGY DETECTION

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**ABSTRACT**—In pattern recognition, observations are often represented by the so called *static features*, that is, numeric values that represent some kind of attribute from observations, which are assumed constant with respect to an associated dimension or dimensions (e.g. time, space, and so on). Nevertheless, we can represent the objects to be classified by means of another kind of measurements that do change over some associated dimension: these are called *dynamic features*. A dynamic feature can be represented by either a vector or a matrix for each observation. The advantage of using such an extended form is the inclusion of new information that gives a better representation of the object. The main goal in this work is to extend traditional Principal Component Analysis (normally applied on static features) to a classification task using a dynamic representation. The method was applied to detect the presence of pathology in the speech using two different voice disorders databases, obtaining high classification rates that remained after a relevant subset feature selection. The proposed scheme substantially reduced the feature space dimension without decreasing the accuracy in the detection. In particular, for the first database the accuracy were in the range from 93% to 95% lowering the space dimension from 32 to 4 variables. For the second database, the performance was around 80% reducing the dimensionality from 32 to 9. Besides, with the proposed method is possible to identify which original dynamic features were relevant for the pathological voice detection task.

**Key Words:** Dynamic features, PCA, Feature extraction, Feature selection, Voice pathology.